

PURPLE LOOSESTRIFE

PURPLE SCOURGE OF NORTH AMERICAN WETLANDS



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Wetland Exotics

Common reed
Glossy buckthorn
Japanese knotweed
Purple loosestrife
Reed canary grass

Phragmites australis
Rhamnus cathartica
Polygonum cuspidatum
Lythrum salicaria
Phalaris arundinacea

erosion control, wetland transfer
wildlife transfer
wetland transfer, flooding
horticulture, wetland transfer
erosion control

Upland Exotics

Autumn olive
Bush honeysuckle
Canada and bull thistles
Common buckthorn
Crown vetch
Garlic mustard
Japanese honeysuckle
Multiflora rose
Tree-of-heaven

Elaeagnus umbellata
Lonicera species
Cirsium species
Rhamnus frangula
Coronilla varia
Alliaria petiolata
Lonicera japonica
Rosa multiflora
Ailanthus altissima

wildlife transfer, horticulture
horticulture, wildlife
agriculture transfer
wildlife transfer
erosion control
herbal, condiment?
horticulture
wildlife, erosion control
forestry

DESCRIPTION

FAMILY: Lythraceae

GENUS and SPECIES: *Lythrum salicaria* (L.)

COMMON NAME: purple loosestrife



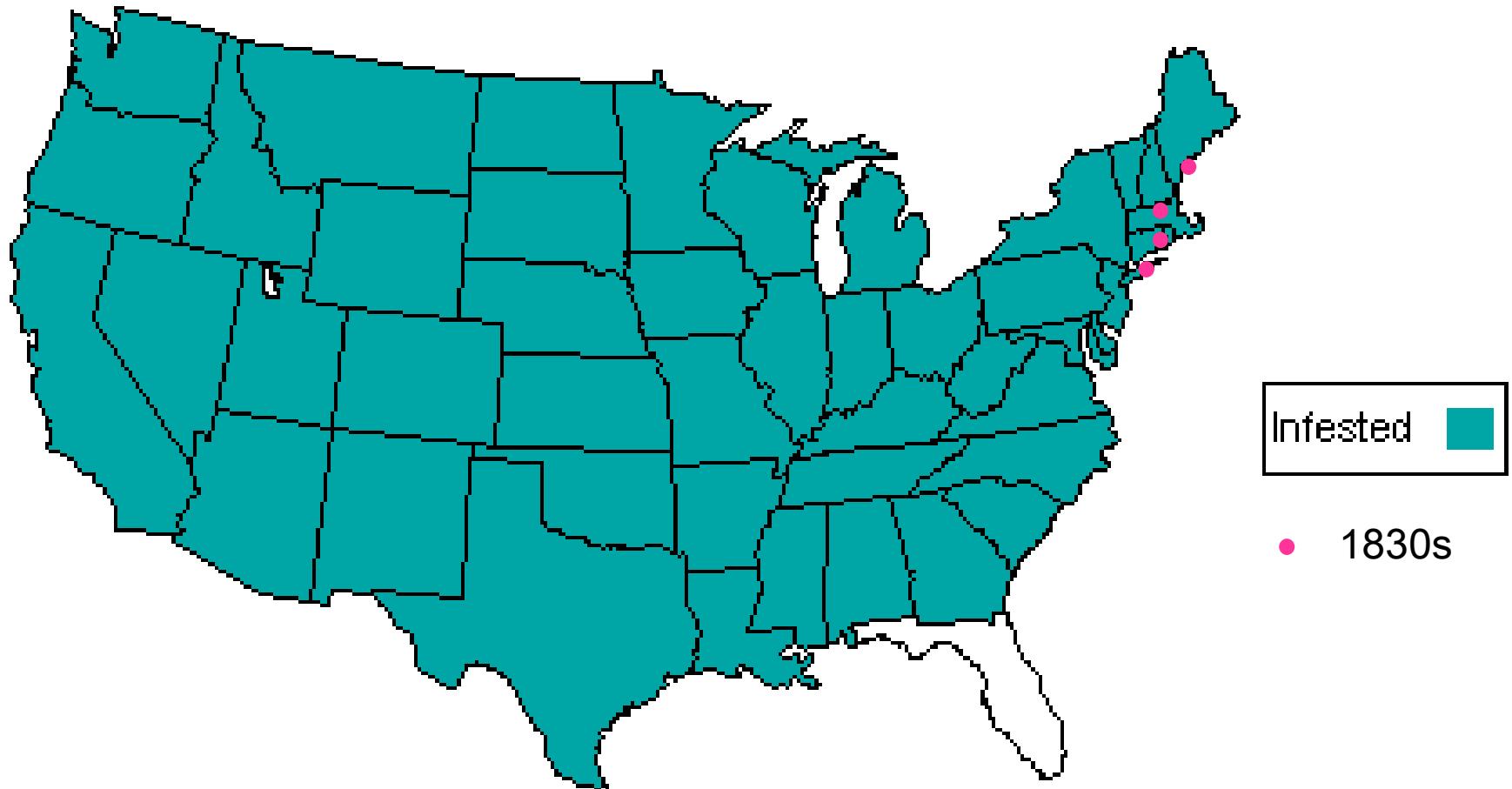
- ❖ wetland perennial herb, 3-9 ft tall, with dense bushy growth, 1-50 stems arising from woody tap root
- ❖ stems die back in winter; stays dormant until spring
- ❖ leaves are elongate, rounded at base, smooth-edged, attached close to stem, opposite/whorled
- ❖ flowers are showy magenta or purple with six petals, insect pollinated; flowers late June through August
- ❖ seeds are sand-grained size; one mature plant can produce 2.7 million seeds per year

PURPLE LOOSESTRIFE is an “ALIEN SPECIES”

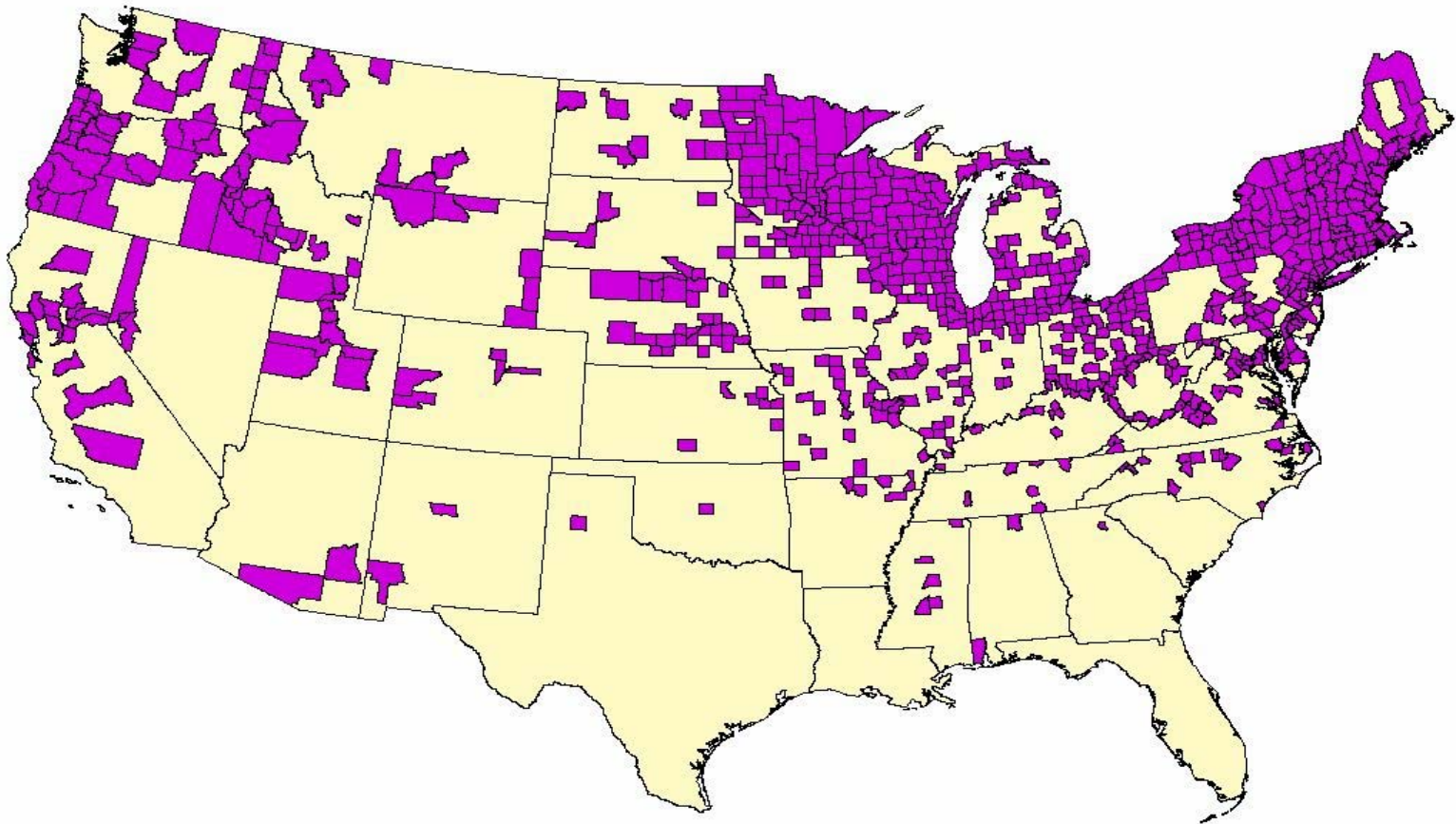
- ❖ non-native, non-indigenous, foreign, exotic
- ❖ a species, subspecies, or lower taxon occurring outside of its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could not occupy without direct or indirect introduction or care by humans)
- ❖ includes any part, seeds or vegetative part, of such species that might survive and subsequently reproduce

IUCN 2002

SPREAD OF PURPLE LOOSESTRIFE IN THE LOWER 48 STATES (USGS)



LOOSESTRIFE DISTRIBUTION IN THE UNITED STATES (USDA 2003)



ENGLAND



NEW ENGLAND



MIDWEST



PURPLE SCOURGE

Ecological Nightmare



- ❖ spreads easily; long-lived, up to 10 years; reproduces from plant fragments and seeds; flowers abundantly from June and into September; seed production begins in early August; a single plant can produce 2.7 million seeds; seeds easily dispersed by wind, water, wildlife, humans.
- ❖ forms dense monocultures, crowding out native plants and decreasing species diversity; chokes off wildlife habitat, waterfowl nesting areas, and reduces wildlife access to water.
- ❖ alters ecological processes; changes substrate conditions by causing buildup of plant material around its roots, thus creating a drier site around the root base. This in turn allows the plant to creep further out in the water through rhizome growth.
- ❖ impedes water flow, accelerates eutrophication of water bodies.
- ❖ infests not only wetlands, but can migrate to lowland pastures.

HOW WAS IT INTRODUCED?



- ❖ intentional introduction by horticulturalists as an ornamental and for medicinal purposes such as treatment for diarrhea, dysentery, and bleeding; later for honey bee industry
- ❖ accidental introduction through ship ballast or on infested sheep and raw wool

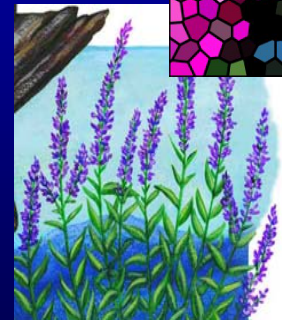
THE PRETTY PLANT:

Purple Loosestrife in ART and LANDSCAPING

- ❖ Landscape plants - cultivars
- ❖ Floral arrangements
- ❖ Ceramics
- ❖ Paintings



'MORDEN'S PINK'



DO HORTICULTURAL CULTIVARS HYBRIDIZE WITH WILD PURPLE LOOSESTRIFE?

YES - Recently developed horticultural cultivars of *Lythrum virgatum* hybridize with wild purple loosestrife, *Lythrum salicaria*



Lythrum virgatum
(European wand)



'MORDEN PINK'



'ROSE QUEEN'

X



Lythrum salicaria
(purple loosestrife)

=

HYBRIDS

(often more vigorous
than parents; seed
80% viable)

'Morden Pink' was developed in 1937 as an infertile clone, but it crosses with *P. salicaria* and produces fertile seed. U.S. FWS outlawed planting *L. salicaria* in late 1980s, but nurseries still sell cultivars, which may be hybrids.

AVOID PURCHASE OF THESE CULTIVARS AT NURSERIES!



- ❖ Columbia Pink
- ❖ Dropmore Purple
- ❖ Happy
- ❖ Morden Gleam
- ❖ Morden Pink
- ❖ Morden Rose
- ❖ Mr. Robert
- ❖ Rose Queen
- ❖ The Rocket

Several nurseries have recognized the invasiveness of purple loosestrife and have voluntarily removed all species and cultivars from their inventory.

HORTICULTURAL REPLACEMENTS: MIDWEST NATIVE PLANTS



□ Blue Flag Iris (*Iris versicolor*)



□ Blue Vervain (*Verbena hastata*)



□ Cardinal Flower (*Lobelia cardinalis*)



□ Delphinium (*Delphinium* spp.)



□ False Spirea (*Astilbe* spp.)



□ Fireweed (*Epilobium angustifolium*)



□ Garden Sage, Salvia (*Salvia* sp.)



□ Joe-Pye Weed (*Eupatorium* spp.)



□ Lilies (*Lilium* spp.)



□ Lupine (*Lupinus*)



□ Obedient Plant (*Physostegia virginiana*)



□ Pickerel Weed (*Pontederia cordata*)



□ Spiked Gayfeather, Blazing Star (*Liatris* spp.)



□ Purple Coneflower (*Echinacea purpurea*)



PREVENTION

“An ounce of prevention is worth a pound of cure”.

(ENGLISH PROVERB)



Preventing the plant from invading North American ecosystems or crossing international borders did not occur. Several control methods are now being used to bring purple loosestrife populations under control after establishment. These have had varied success.

CONTROL LEVELS



ERADICATION— removing all plants where they have established to prevent them from spreading into non-infested areas is the best way and least costly in the long run. (Recently LA had a small colony: USGS staff removed it before reproduction could occur). Plants should be removed before they flower to prevent seed spread. This is usually impossible if the plant has been at the site for some time. Removal can be done by hand pulling or using spot treatments with herbicide, particularly glyphosate based (Rodeo). Monitoring of the site is necessary to remove new seedlings.

REDUCTION – applied to larger areas where PL has larger populations: requires a combination of manual, chemical, and biocontrol agents.

CONTAINMENT – applied to large areas in combination with reduction methods. Containment prevents further spread into adjacent area that are not infested.

INTEGRATED PEST MANAGEMENT



❖ MECHANICAL CONTROL

hand pulling, digging, cutting

❖ CHEMICAL CONTROL

glyphosate herbicide
(Rodeo, Glypo, Roundup)

2,4-D

❖ BIOLOGICAL CONTROL

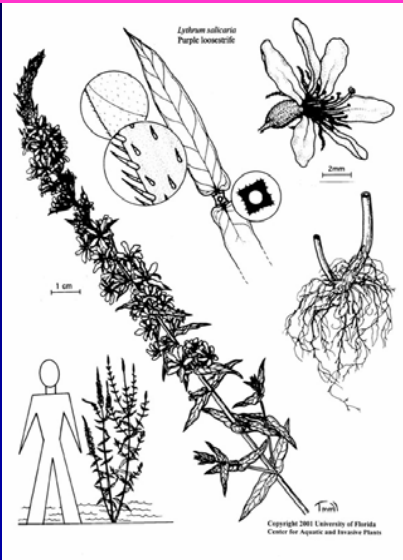
insect herbivores

fungal pathogens

❖ COMBINATION

PURPLE LOOSESTRIFE CONTROL

SIZE OF INFESTED AREA



Purple loosestrife, *Lythrum salicaria*, has purple flowers with 5-6 petals. The flowers are packed together in a spike. The stem is square in cross-section and the leaves are arranged opposite each other along the stem. The leaves have a smooth leaf edge. Plants can be as tall as a human. Roots are deep and difficult to remove.

DENSITY OF INFESTED AREA

	Isolated plants	Small less than 1 acre (0.1 - 0.5 hectares)	Medium up to 4 acres (0.5 - 2 hectares)	Large more than 4 acres (more than 2 hectares)
Low Density 1 to 50 plants (1 - 25% of the area)				
Medium Density 50 to 1,000 (25 - 75% of the area)				
High Density more than 1,000 (75 to 100% of the area)				

KEY TO CHART SYMBOLS



Digging & Hand Pulling

Pulling purple loosestrife by hand is easiest when plants are young (up to two years) or when in sand. Older plants have larger roots that can be eased out with a garden fork. Remove as much of the root system as possible, because broken roots may sprout new plants.



Biological Control

In areas of severe purple loosestrife infestation, manual and chemical control efforts are ineffective and may in fact contribute to the problem. However, the use of specially selected insects that feed on purple loosestrife is being studied to determine the effectiveness of this method for long-term control in these higher density areas. Biological control is discussed in more detail in a following section.



Cutting
Removing flowering spikes will prevent this year's seeds from producing more plants in future years – remember each mature plant can produce over 2 million seeds per year. Also, remove last year's dry seed heads, as they may still contain seeds. Finally, cut the stems at the ground to inhibit growth.



Chemical Control

If an infestation is in a dry, upland area, and on your own property, an approved herbicide can be applied to individual plants by selective hand spraying. Broadcast spraying is not recommended as it kills all broad-leaved plants, leaving the area open to further invasion from nearby sources of purple loosestrife. This also provides an opportunity for seeds present in the soil to sprout.

Chemical control is used in the United States to control purple loosestrife near or in water, however, as of 1996, no herbicide has been approved for this type of application in Canada. **NOTE:** In the U.S., a permit is required; call a state natural resource agency for more information.



Galerucella beetle for biological control

BIOCONTROL



Galerucella pusilla — a leaf-feeding beetle (young larvae feed on young leaf buds; older larvae feed on all above-ground portions of plant); can reduce plant biomass by 99%



Galerucella californiensis — a leaf-feeding beetle (same as above)

Hylobius transversovittatus — a root-mining weevil (larvae)



Nanophyes mamoratus — a flower weevil (adults feed on leaves and floral spikes; larvae on flower buds); up to 70% reduction in seed production



While beetles have required up to six years to become established, in some states insects are causing substantial damage to purple loosestrife infestations.

WHAT YOU CAN DO TO HELP CONTROL PURPLE LOOSESTRIFE



- ❖ Remove invasive plants from your property. If you find a stand of invasive plants, use the appropriate control measure to remove it. The WEB SITES below (and in your packet) can help you identify these plants and the proper control.
- ❖ Avoid planting invasive non-native species that could spread from your property. Some of the same characteristics that make a good garden plant (low maintenance, drought tolerance, vigor and pest resistance), can make it a great weed. So do a little research on these plants first.
- ❖ When in doubt, choose plants that are native to your area.
- ❖ Volunteer for a group that monitors or eradicates invasive plants. Many garden clubs, local native plant societies and environmental groups monitor and eradicate invasive plants.
- ❖ Call your local university extension service or state department of environmental conservation for more information. Where eradication is successful, establish a native plant restoration program.

POLICY REGARDING INVASIVES



- ❖ Quarantine laws for entry of live biological materials at national and international borders should be changed to ‘guilty until proven innocent’, instead of the current strategy of denying entry only to species already proven noxious or detrimental.
- ❖ Government agencies should inform people about the enormous ecological and economic impacts of exotic, invasive plants such as PL. Integrate information between government agencies, Exotic Pest Plant Councils, and Native Plant Societies.
- ❖ Government agencies should work with the nursery industry (FL, MN, Australia) to identify species that could be taken off the market voluntarily by the nurseries. Use tag warning system to inform public of invasiveness. Nurseries could remove the species and use this to promote their environmentally friendly policies. An anonymously appointed group could inspect nurseries for presence of prohibited plants.

POLICY REGARDING INVASIVES (cont'd.)



❖ Government agencies should create dialogue among nursery trade groups, weed science societies, university ecologists, private non-profit groups, and government scientists to collaborate on:

- Development of research and coordination of data analysis on impacts and biology of invasive plant species; identify conditions that predict invasiveness; understanding pathways of potential invaders arriving at US borders may be gleaned from USDA APHIS Port Information Network.
- Development of guidelines for botanical gardens to take a more active role to reduce the damage caused by invasive plants.
- Horticultural screening of new plant introductions for potential invasiveness and for development of risk assessment.

SELECTED WEB SITES

www.invasivespecies.gov/toolkit/control.shtml a gateway to federal and state Invasive species programs.

www.dnr.state.wi.us/org/es/science/publications/ss981_2003.htm biocontrol manual.

www.aphis.usda.gov/npb/statenw.html regulates importation of plants and animals at the US border.

www.dnr.state.wi.us/org/land/er/invasive/factsheets/loose.htm has numerous links.

www.invasivespecies.gov is a clearinghouse of information from the federal government.

www.plants.usda.gov is a database containing standardized information about plants.

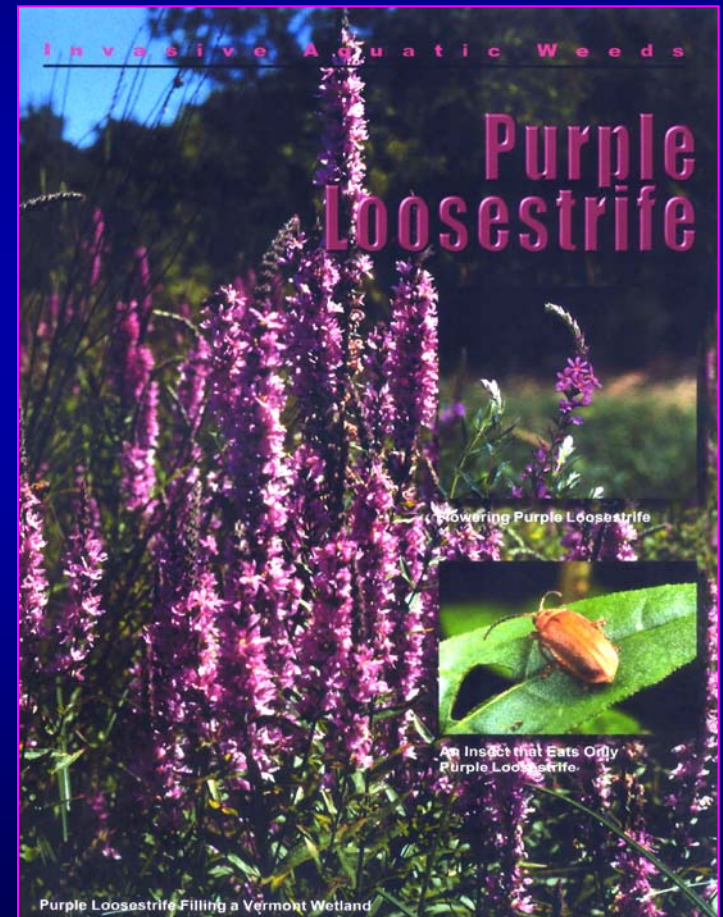
www.wiscwetlands.org provides reading, survey information, and links.

www.dnv.cornell.edu/bcontrol/purple.htm has technical and workshop information.

<http://www.efn.org/~ipmpa/Noxploos.htm> is a technical bulletin on purple loosestrife control.



PUBLIC INFORMATION, EDUCATION, AND PARTICIPATION ARE THE KEYS TO CONTROL!





USGS Researcher Demonstrates Purple Loosestrife
Vegetation Survey to Volunteers in Wisconsin

Purple Loosestrife Workshop

August 29-30, 2003

Northwest Sports Complex
Spooner, Wisconsin 54801

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